



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/857,540	07/23/2001	Sugio Miyazawa	939 026	6358

25191 7590 05/21/2004

BURR & BROWN  
PO BOX 7068  
SYRACUSE, NY 13261-7068

EXAMINER

DONG, DALEI

ART UNIT PAPER NUMBER

2879

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/857,540

Applicant(s)

MIYAZAWA ET AL.

Examiner

Dalei Dong

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,426,343 to Rhodes in view of U.S. Patent No. 4,285,732 to Charles.

Regarding to claims 1-3, Rhodes discloses in Figures 1-3, "a first end of a high pressure arc discharge lamp tube assembly 10, wherein the opposite end is identical or similar. The envelope of assembly 10 is a transparent alumina tube 11. Each end of tube 11 is sealed by a sealing member, which may be formed into a cap seal 12 as shown in FIG. 1, or a sealing insert 13, 13' as shown in FIGS. 2 and 3. Sealing members 12, 13 *capillaries comprises of alumina material or an alumina-based ceramic material*, 13' support a cylindrical metal feedthrough 14. An interface 15 between tube 11 and sealing member 12, 13, and 13' is direct without the use of sealing frits or brazing alloys, while an interface 16 between sealing member 12, 13 and feedthrough 14 may be direct or, as in FIG. 3, hermetically sealed by standard frit technology" (column 4, lines 10-23).

Rhodes also discloses in Figures 1-3, "sealing members 12, 13 and 13' are preferably made from a compressed mixture of between about 95.0 to about 99.9 percent by weight of highly pure fine alumina doped with between about 0.1 to about 5.0 percent

by weight of yttrium oxide, and between about 0.01 to about 0.5 percent by weight of magnesium oxide. The composition is cold pressed, or machined into either a cap seal 12 or a sealing insert 13, 13' with an axial hole 17. Upon sintering, the volume of the sealing member 12, 13 and 13' decreases. Accordingly, both its outer and inner diameter decreases. The dimensions of the unsintered sealing member 12, 13 and 13' are selected in relation to the dimensions of the ceramic tube 11; specifically, the outside diameter of the tube when employing cap seal 12, or the inside diameter of the tube when using sealing insert 13, 13'. In addition, the outside diameter of feedthrough 14 is considered. As is known in the art, the differential shrinkage of the components upon sintering causes an interference fit in which the components are forced together to form a bond. Typically, sealing members 12, 13 and 13' have an interference fit of between about 4 to about 14 percent with both tube 11 and feedthrough 14. Preferably, interface 15 has between 4 and 8 percent interference fit with tube 11, while interface 16 has between 5 and 9 percent interference fit with feedthrough 14. Most preferably, interface 15 and interface 16 have interference fits of 4 percent and 5 percent with their respective components, which provides hermetic seals and reduces strain" (column 4, lines 24-52).

Rhodes further discloses in Figures 1-3, "the materials of the tube 11 and sealing members 12, 13, 13' are selected to have similar thermal expansion coefficients and to be chemically compatible. Typically, tube 11 is a polycrystalline alumina (PCA) arc tube. Standard PCA typically contains about 0.035 percent by weight yttrium oxide and 0.05 percent by weight magnesium oxide as sintering aids. Some PCA is sintered containing only magnesium oxide sintering aids. Sealing member 12, 13, 13' compositions are

selected based on microstructure, reactivity, and bonding with the PCA arc tube 11 and feedthrough 14. Preferably, sealing members 12, 13, 13' include between about 0.1 to 5.0 percent by weight yttrium oxide and about 0.01 to about 0.5 percent by weight magnesium oxide with high purity (greater than 99.8 percent) alumina powder. More preferably, when forming cap seals 12, between about 1.0 to 5.0 percent by weight yttrium oxide and between about 0.02 to 0.25 percent by weight magnesium oxide are mixed with alumina powder *an amount of magnesium oxide, yttrium oxide or their combination present in the material of the capillaries is 1.5 times greater than that present in the material of the central body*. Most preferably, between about 2.0 to 3.0 percent by weight yttrium oxide and between about 0.05 to 0.1 percent by weight magnesium oxide are mixed with alumina powder. When forming sealing inserts 13, 13', however, similar compositions give the arc tube 11 an opaque appearance due to the formation of light scattering second phases, which migrate into the PCA arc tube wall, as described below. Therefore, compositions having between about 0.10 to 0.5 percent by weight yttrium oxide and 0.02 to 0.25 percent by weight magnesium oxide with alumina powder are preferred for formation of sealing inserts 13, 13'. Most preferably, sealing inserts include between about 0.15 to 0.25 percent by weight yttrium oxide and between about 0.05 to 0.1 percent by weight magnesium oxide with alumina powder" (column 4, line 53 to column 5, line 18).

However, Rhodes does not disclose the average diameter of alumina grain in the capillaries is in the range of 10  $\mu\text{m}$  to 25  $\mu\text{m}$ . Charles teaches "an optically translucent polycrystalline sintered body comprises providing at least a substantially homogeneous

dispersion composed of alumina, MgO or precursor therefor, and an additive selected from the group consisting of  $\text{ZrO}_2$ ,  $\text{HfO}_2$  and mixtures thereof, or precursors therefor, said alumina ranging in composition from  $\alpha\text{-Al}_2\text{O}_3$  to at least about 80% by weight  $\alpha\text{-Al}_2\text{O}_3$  with the remaining alumina being of polymorphic form other than  $\alpha$ , said MgO being present in an amount ranging from about 0.03% by weight to less than about 0.15% by weight of said alumina, said  $\text{ZrO}_2$  being present in an amount ranging from higher than 0.002% by weight up to about 0.07% by weight of said alumina, said  $\text{HfO}_2$  being present in an amount ranging from higher than 0.003% by weight up to about 0.12% by weight of said alumina, said mixtures of  $\text{ZrO}_2$  and  $\text{HfO}_2$  being composed of all ratios of  $\text{ZrO}_2$  and  $\text{HfO}_2$  and being present in a total amount ranging from higher than 0.002% by weight up to about 0.12% by weight of said alumina, said dispersion having an average crystallite size ranging from about 0.05 micron to less than one micron, forming said dispersion into a green body having a density of at least about 30% of the theoretical density of 3.98 g/cc for alumina, and sintering said body in an atmosphere of hydrogen having a dew point higher than  $-30^\circ\text{C}$ . at a sintering temperature ranging from about  $1750^\circ\text{C}$ . to about  $1950^\circ\text{C}$ . producing a sintered body of theoretical density based on the density of 3.98 g/cc for alumina, said precursor decomposing completely below said sintering temperature to form said oxide and by-product gas, said sintered body containing magnesium in an amount equivalent to from about 0.03% MgO by weight to less than about 0.15% MgO by weight of said body and a component selected from the group consisting of zirconium, hafnium, and mixtures

thereof, said zirconium being present in an amount equivalent to from higher than about 0.002%  $\text{ZrO}_2$  by weight up to about 0.07%  $\text{ZrO}_2$  by weight of said sintered body, said hafnium being present in an amount equivalent to from higher than 0.003%  $\text{HfO}_2$  by weight up to about 0.12%  $\text{HfO}_2$  by weight of said sintered body, said mixtures thereof being composed of all ratios of said zirconium and hafnium and being present in an amount equivalent to from higher than 0.002% of the di-oxides thereof by weight up to about 0.12% of the di-oxides thereof by weight of said sintered body” (column 2, line 45 to column 3, line 22).

Charles also teaches “The present polycrystalline sintered body has an average grain size ranging from about 15 microns to about 100 microns. An average grain size less than about 15 microns usually renders the sintered body with poor optical properties. On the other hand, an average grain size higher than about 100 microns renders the sintered body with poor strength. Preferably, for best optical translucency and strength, the present sintered body has an average grain size ranging from about 20 microns to about 50 microns. The present polycrystalline sintered body is useful for optical applications such as enclosures for arc tubes” (column 7, lines 56-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have manufacture the sealing member or capillaries of Rhodes with average grain size of Charles in order to renders the sintered discharge lamp with excellent optical properties while maintaining and improving the strength of the sintered discharge lamp.

Regarding to claim 5, Applicant claims that the central body and the capillaries are simultaneously sintered, however the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

***Response to Arguments***

3. Applicant's arguments with respect to claims 1-3 and 5 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of composition of a discharge lamp.

U.S. Patent No. 5,592,049 to Heider.

U.S. Patent No. 5,861,714 to Wei.

U.S. Patent No. 6,169,366 to Niimi.

U.S. Patent No. 6,525,475 to Scholz.

U.S. Patent No. 6,635,993 to Niimi.



Art Unit: 2879

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571)272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D.D.  
May 11, 2004

  
VIP PATEL  
PRIMARY EXAMINER